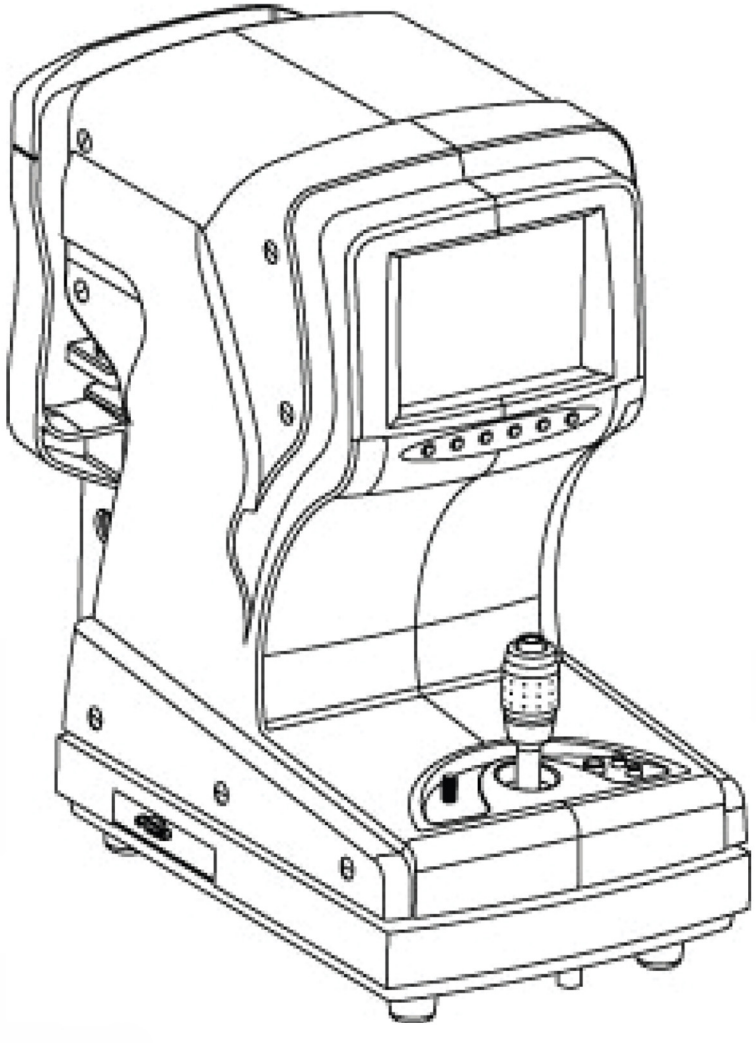
User's Manual

Type: ERK-5200



IMPORTANT NOTICE

- This manual should be read and understood before operating.
- This equipment can be wrong operated by which generates electromagnetic waves (mobile phone, radiotelegraph, remote-controlled things etc). Please pull apart this equipment from those instruments.
- When this manual is issued, all information in this manual are confirmed and concluded carefully. But EZER is not responsible for the mistake or oversight of using this manual.
- EZER can correct, improve and reform the product or its specification on EZER own sole authority without any notice whenever have to do. And then, this manual may not contain those alteration sometimes.
- This manual should be placed in a user's sight.

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Product Constructions

▣ ERK-5200 Body

ERK-5200

- Model Eye
- User Manual
- Power Cable
- Print Paper
- Chin rest Paper
- Dust Cover

Specifications

[Refractometry]		
VD	0.0, 12.5, 13.5	
SPH	-25.00 ~ +22.000D (VD= 12mm) (0.12 / 0.25D step)	
CYL	0.00 ~ ±10.00D (0.12 / 0.25D step)	
AX	1 ~ 180° (1°step)	
Astigmatism Indication	-, +, MIX	
PD	10 ~ 85 mm	
Minimal Pupil Size	∅2.0 mm	
[Keratometry]		
Cornea Curvature Radius	5.0 ~ 10.2 mm (0.1 mm step)	
Cornea Refraction	33.00 ~ 67.50D (Cornea equivalence power=1.3375)(0.05 / 0.12 / 0.25D)	
Cornea Cylinder Power	0.00 ~ -15.00D (0.05 / 0.12 / 0.25D step)	
Cornea Cylinder Axis	1 ~ 180°(1°step)	
Cornea Diameter	2.0 ~ 12.0 mm (0.1 mm step)	
Memory	Can store 10times measurements result of both eyes	
Printer	Built-in Printer	
Monitor	6.4”TFT LCD Monitor	
[Environmental Conditions]		
Operating condition	Temp: +10℃ ~ + 40℃	Humidity: 30% ~ 85% RH
Keeping & moving	Temp: -10℃ ~ +55℃	Humidity: 10% ~ 95% RH

Power	AC100-240V, 50/60Hz
Power Consumption	Approximately 100VA
Size	300(W) × 500(D) × 430(H) mm
Weight	Approximately 20Kg

SAFETY INFORMATION

■ Symbols marked on the instrument

	Type B EQUIPMENT
~	Alternating current
	Protective earth (ground)
	Attention, consult ACCOMPANYING DOCUMENTS
0	Off (power : disconnect to the mains)
1	On (power : connection to the mains)

Warning! When you see '**WARNING**' or '**CAUTION**', please do as this manual says.

Please read and understand this manual enough before using and operating.

WARNING	The mark is that a danger could happen, unless be careful. You or the other person could be injured seriously.

CAUTION

The mark is that a danger could happen, unless be careful.

You or the other person could be injured slightly and the equipment could be damaged too.

NOTE

To emphasize the basic information.

To avoid using inappropriately, please read this information carefully.

■ General Safety Information

WARNING

- Unless use this equipment in a standard power source, a fire or an electric shock can happen.
- Must connect or separate the electric wire after switching off the main power.
- Never operate this equipment with a wet hand or can be injured by a serious electric shock.
- Never disassemble or try to modify this equipment yourself or a fire, an electric shock can happen.
- There are some dangerous parts inside of this equipment. Touching those parts in carelessness, can make you to be injured or die.
- Please switch off the main power and separate the electric wire from A/C socket

when the symptoms as occur belows.

- when it is smoky, smelling, noisy.

- when slop any liquid or drop any metal into the equipment.

- when drop this equipment or case's broken.

CAUTION

- To reduce the electric shock, please connect the cable into the grounded A/C socket all the time.
- Don't put the object person's hand or fingers on the lower part under the chin rest. It's dangerous and can be injured.
- The forehead rest should be always cleaned with cleansing liquid like ethyl or something to protect a every new patient from a contagion.
- Chin rest paper should be replaced every time for a new patient for hygiene.
- Do never put anyone's hand or finger between the Stage and the Base. It could be dangerous and injured.

---

1. Special Ability

- Supporting various measurement

  ERK-5200 can measure not only CORNEA REFRACTIVE POWER, CORNEA CURVATURE, but also DIAMETER of CORNEA, CURVATURE OF A CONTACT LENS. So it is very efficacious for prescribing any glasses or contact lenses.

- Wide area of spherical power.

  ERK-5200 has the measurable wide area from -25D to +22D.

- Precision measurement

  Then cloud and fog system of inside fixed target makes the object eye to be comfortable and natural. So the measurement can be more precisional.

- PD measurement

- Can be the best suited for the user

  The measurement modes can be ordered as the user want and can be deleted unless useful. The printing orders can be changed.

2. Required Attentions

- Do not hit or drop the equipment. It can be damaged and deteriorated in the quality by any strong impact.

  Please handle with care.

- Being under ultraviolet or too much bright lighting can obstruct precision measurement.

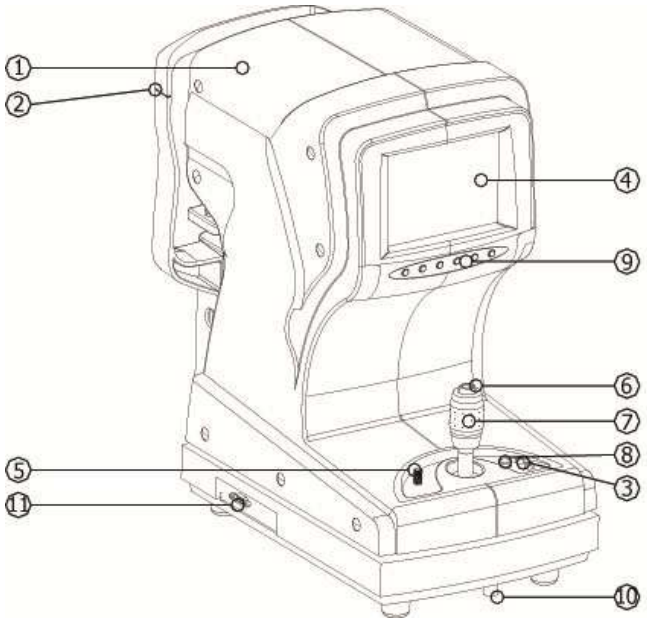
- According to the cold weather, dew can occur on the lens or somewhere. Please wait for disappearing it

  before using.

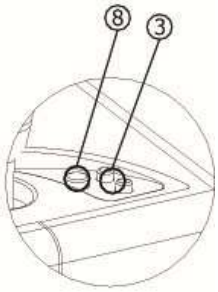
- Please keep clean the objective lens, or there can be a test error.
- Do not use alcohol, thinner, benzene to clean this equipment. The equipment can be damaged.
- Do use as the manufacturer's lead when you use it with other machinery in connection.
- If you find smokes, smells or noise, during you are using this equipment, pull the power out from the socket and call to service engineer or distributor.
- When you try to move this equipment, check the power off first. Then, fix the body with clamping screw and hold the bottom of the body with both hands.
- During you don't use it for a long time, disconnect the power cable from socket and put the dust cover on it.

3. Name and Function of each Parts

3-1 Body

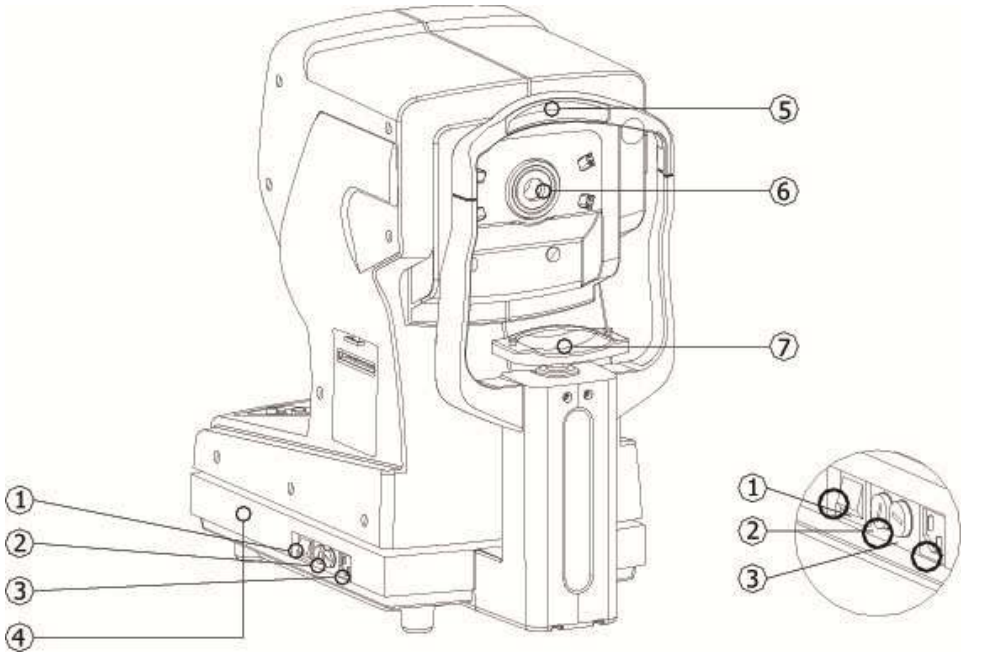


Front Side



③, ⑧ Buttons

① Measurement Head	Performing measurement part.
② Height Indication	Set the height of eyes here with controlling the chin-rest.
③ Chin Rest Control Button	Control the chin-rest.
④ Monitor	Display current situation.
⑤ Stage Clamping Screw	Fix the body.
⑥ Measurement Button	Do the measurement.
⑦ Control Lever	Control location and focus on.
⑧ Print Button	Print the test result.
⑨ Operating Board	All sorts of buttons here.
⑩ Clamping Bolt	Fix all to move.
⑪ Interface Device	Communication port to connect with other equipments.

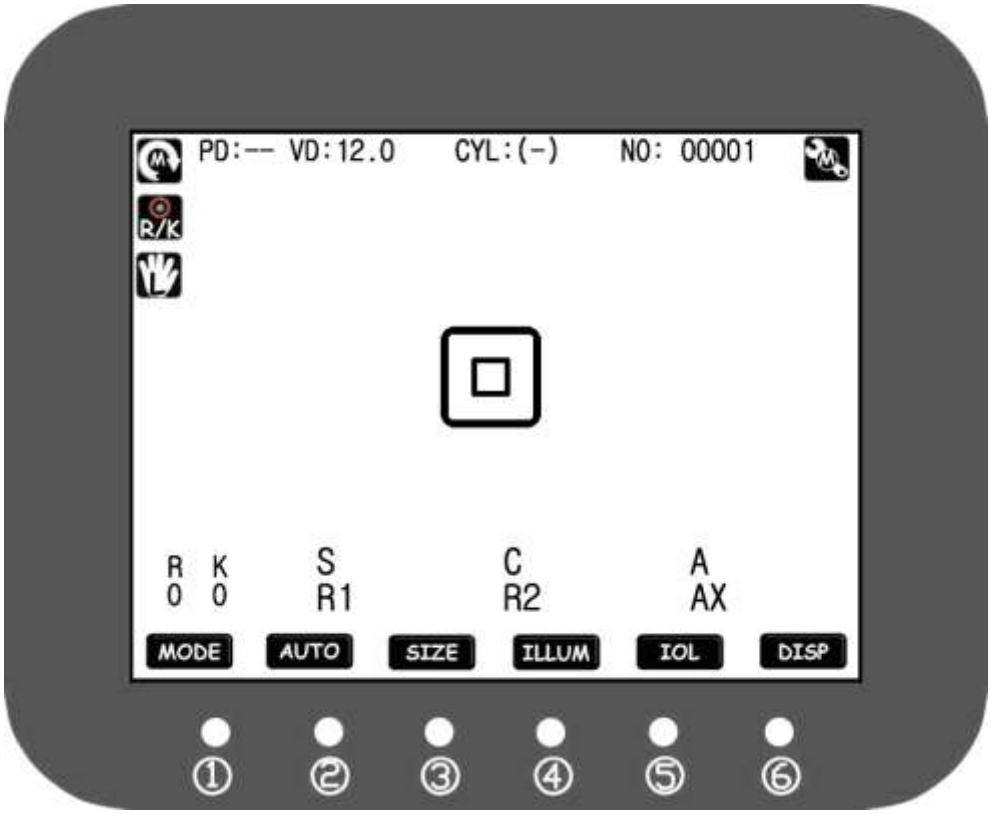


①, ②, ③ Buttons

Back Side

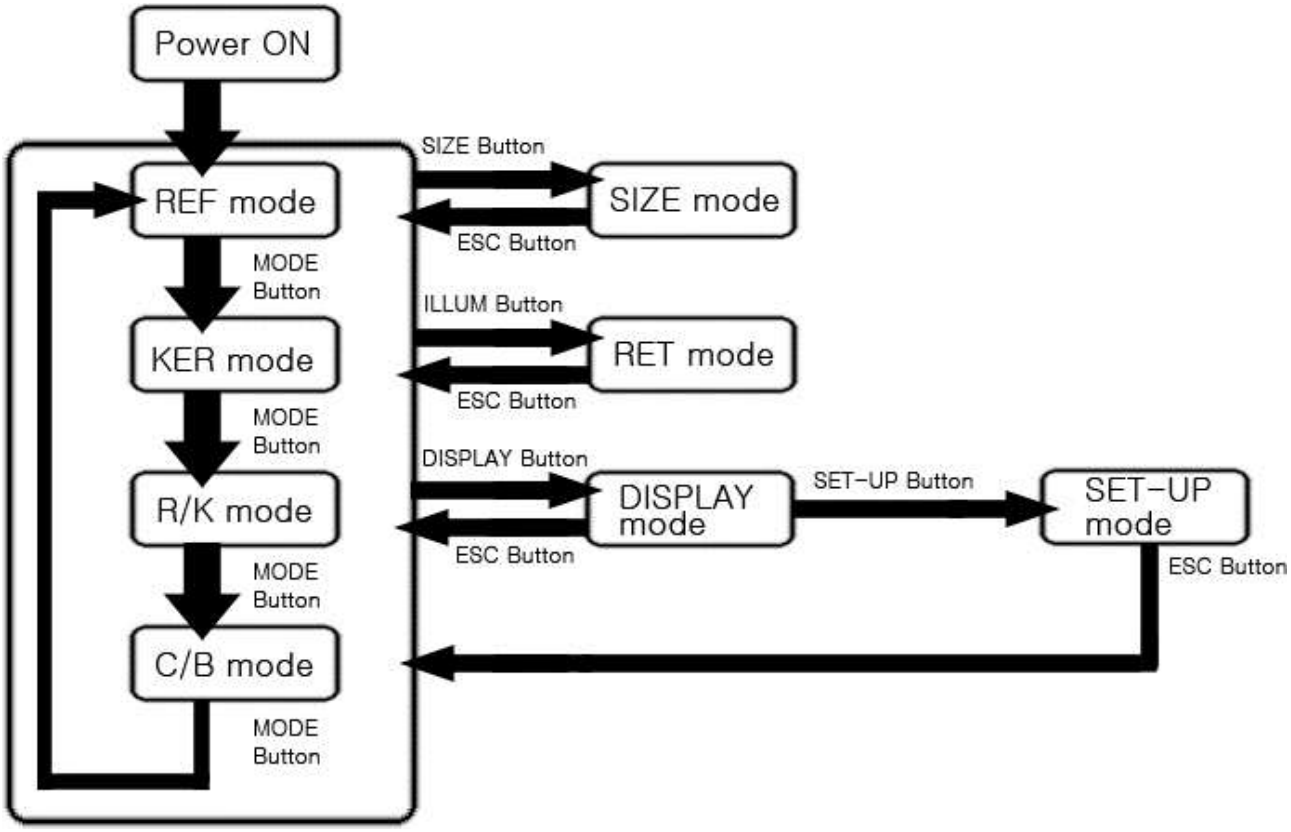
① Power Switch	Power ON / OFF switch
② Fuse	Protect the equipment from overvoltage.
③ Power Supply Socket	Connect with power cable.
④ Product Label	Indicate the product name and some information.
⑤ Forehead Rest	Forehead rest
⑥ Measurement Window	Window where a patient should see
⑦ Chin-rest	Chin-rest

3-2 Operating Board



① MODE	Change the measurement mode

② AUTO	Set up Auto or Manual measurement
③ SIZE	Measure the size of cornea
④ ILLUM	Suspend the monitor and check the cornea or the contact lens
⑤ IOL	Measure the eyesight of Cataract patients or artificial crystalline patients. In this mode, PRK-9000 determines the condition of the eyes automatically to detect even if there are IOL's or cataracts and measure them.
⑥ DISPLAY	Show the result of the measurement



ERK-5200

<Each Buttons and Modes>

4. Practice with a Model eye.

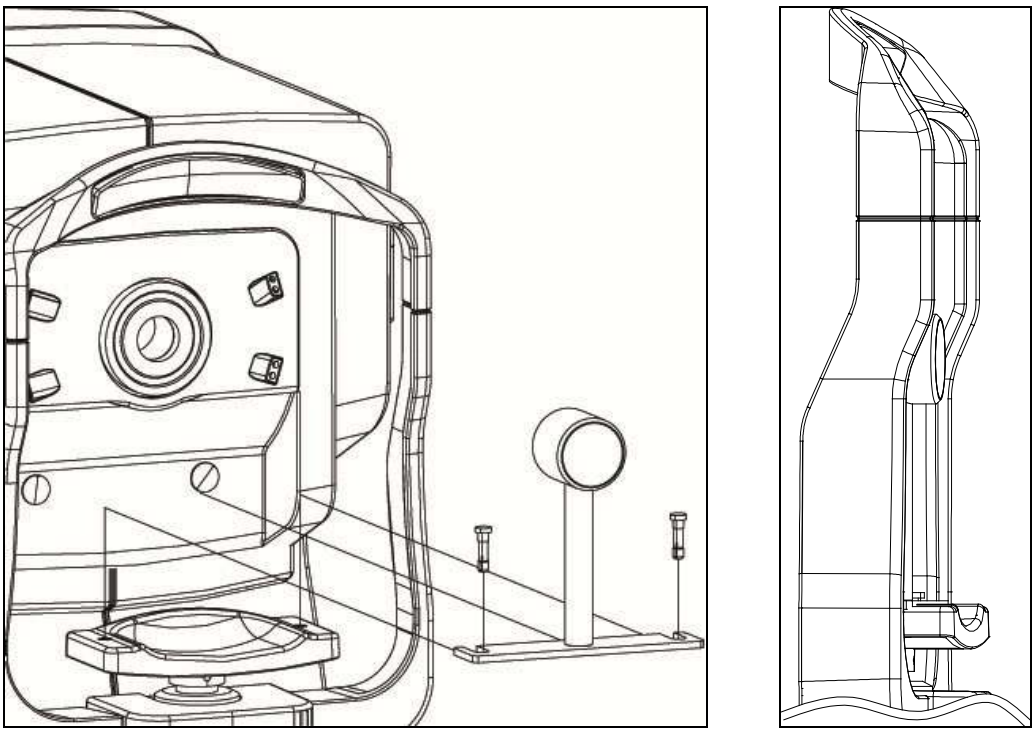
Practice the measurement with a model eye before do it with a person.

(1) Release the stage clamping screw and bolt.

(2) Turn the switch on.

(3) Install the model eye

Install the model eye on the chin rest with the fixing pin.

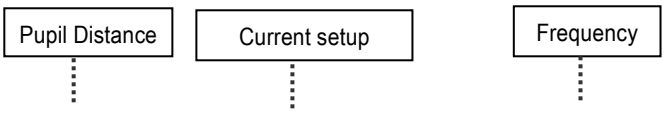


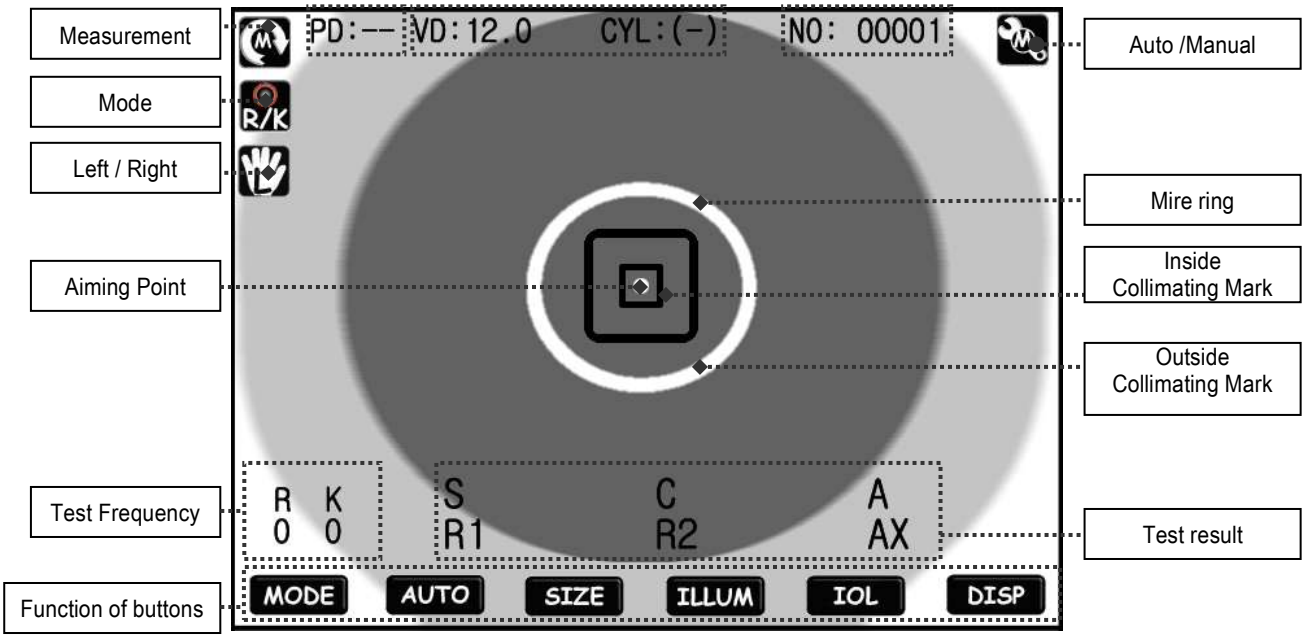
(4) Control the height of model eye

Press the chin rest control buttons and set the height of model eye like the picture above.

(5) Converting to R/K Mode or REF Mode

Press the MODE button several time until the icon(R/K or REF) occur, unless there are one of them on the monitor.





<Picture 2>

(6) Setting focus and location of the model eye

①With watching monitor, control the lever to move and set the aiming point around the inside collimating mark.

②Move and set the aiming point on the middle of the inside collimating mark.

③Control the lever back and forward and make the mire ring to be seen clearly.

(7) Measurement

• Manual Measurement

(a) Focus a point and location of the model eye in accordance with (6) above.

(b) Press the measurement button. Then if an error massage occur on the monitor, do (a) again and press the button again.

(c) Check and compare the measurement result with the value of diopter written on lower part of the model eye. Unless it is satisfied, measure and check gain as a same way.

• Auto Measurement

Operate the auto measurement continuously.

(a) Press AUTO button on the operating board

(b) Focus a point and location of the model eye in accordance with (6) above.

(c) Measurement would start automatically when the Bright Dot occur in the inside collimating mark.

(d) Do the process (c) of Manual Measurement part.

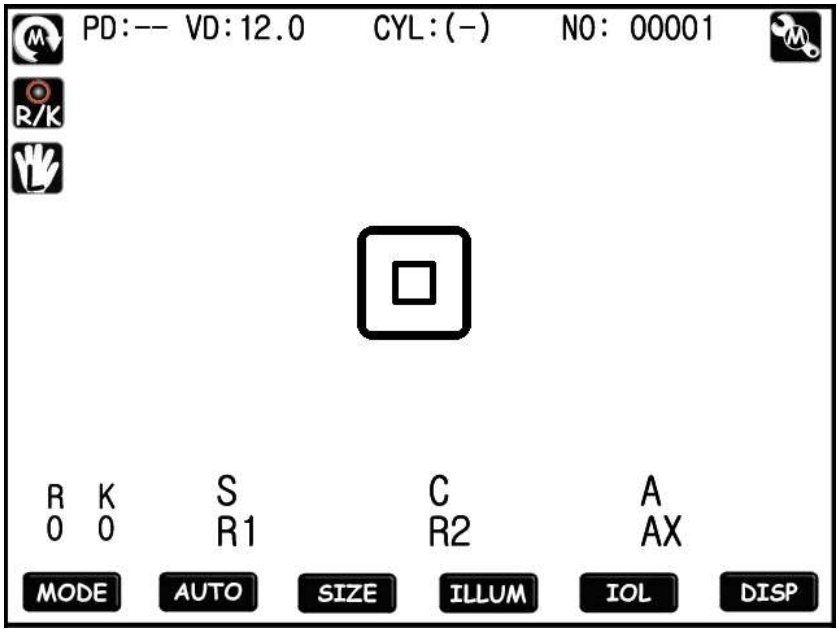
5. Measurement

5-1 Continuous Refraction/Cornea Measurement (R / K Mode)

In R / K Mode, you would do Cornea measurement first and Refraction measurement.

(1) Converting to R / K Mode

Press MODE button until 'R/K' icon displayed on the top left of the monitor.



<Measurement Scene>

(2) Setting up the height of eye

Make a patient to sit on the chair and put his chin and forehead on the chin rest and forehead rest.

To set up the height of the eye, turn and control the chin rest control lever.

(3) Setting focus and measurement location.

(a) Control the lever and set the patient's right eye to be seen on the monitor.

(b) Make him to see the fixed target on the middle of inside.

(c) With watching monitor, control the lever to make the 'mire ring' to be seen clearly.

- On the monitor, if the Mire ring is not seen clearly, request to the object man to open his eye widely until when the measurement has finished. If it's necessary, you raise his eyelid with your finger.

(d) If you are not satisfied with controlling lever, you push the stage for all directions to focus.

- When pupil and center of collimating mark do not fit, request to the object man to see the red roof of the center of the picture.

(4) Measurement

(a) Press Measurement Button.

(b) After measuring, the result would be displayed on the monitor.

(d) When you measure continuously, the last result would be displayed.

(e) You can select an expression of Vertex Distance, the value of CYL and KER in USER's SET.
(Refer to USER's SET)

NOTES:

① If the pupil is out of the outside collimating mark, an error could happen.

② An error could happen by the modification of cornea after surgery or the lens pollution.

③ During IOL switch is on, the trust-ability of measurement can be low.

④ IOL button is only operated on 'R/K Mode' and 'REF Mode'.

⑤ You can convert to IOL or normal with pressing IOL button.

(5) Continuous Measurement; You can measure continuously if it's necessary.

(a) Whenever you measure, the last result would be displayed.

(b) Last 10 Measurement results but except 'error' can be remembered.

(c) Those results would be seen on the monitor in DISPLAY MODE.

(6) Measuring the eye other side.

(a) You measure a left eye to push the stage to right with the control lever.

(b) After the binocular measurement, the PD (pupil distance) would be displayed on the monitor.

- If you push the stage to right eye without pressing the PRINT button, then the last measurement result of right eye would be displayed on the monitor. Then you press the button, the new measurement result would be added.

(7) Print

(a) Press PRINT button to print the result.

(b) It would be printed in accordance with SETUP MODE. (Refer to page. SETUP MODE)

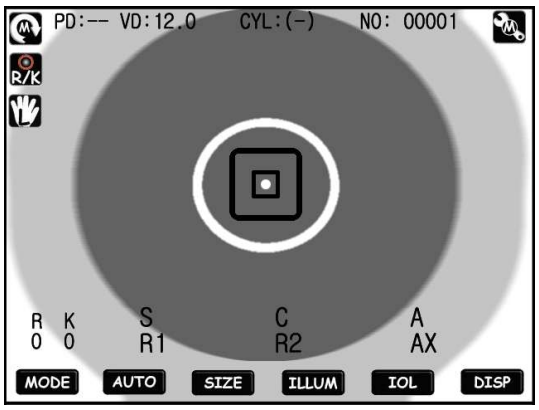
(c) Pull **down** the printed paper to take off.

(d) Write the name of patient on 'NAME' if it is necessary.

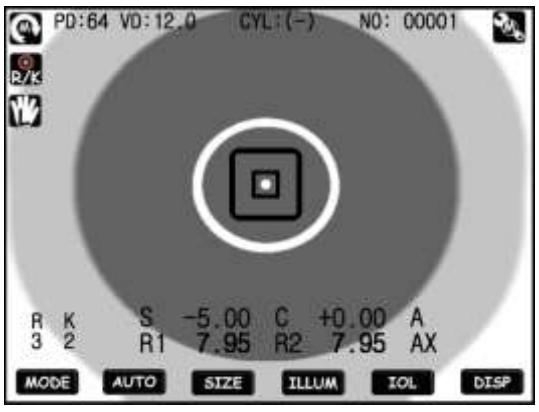
NOTES:

① After Printing / Sending, all data would be removed.

② All printings are printed by heat. To keep the printing for a long time, make a copy of it.



<Controlling Location>



<After Measurement>

EZER ERK-5200
2007 / 05 / 28 09:33:45
NO: 00001
NAME:

[REF]		VD:	12. 0
	Cyl.	Form:	(-)

<R>	SPH	CYL	AX
	-5.00	+0.00	A
	-5.00	+0.00	A
	-5.00	+0.00	A
AVE	-5.00	+0.00	

<L>	SPH	CYL	AX
	-2.50	+0.00	A
	-2.50	+0.00	A
	-2.50	+0.00	A
AVE	-2.50	+0.00	A

PD = 63mm

[KER] Index: 1.3375

<R>	mm	D	AX
R1	7.95	42.50	
R2	7.95	42.50	
AVE	7.95	42.50	
CYL			

<L>	mm	D	AX
R1	7.95	42.50	
R2	7.95	42.50	
AVE	7.95	42.50	
CYL			

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<Print>

Level	(Trust-ability)
A	(High)
B	
C	
D	
E	(Low)

CAUTION

- Do not put your hand or fingers between the stage and the base. It could be damaged.
- Clean the forehead rest with ethyl or something like it for every new patient.
- Replace a chin rest paper for every new patient.

5-2 REF Mode

You can only measure a Refraction on this mode.

(1) Select REF Mode.

Press the 'MODE' button several times until 'REF' mark is displayed on the top left of the monitor.

(2) Do as like (2) of 'R/K' Mode.

(3) Setting focus and location.

Make the pupil and the collimating mark to be fit and focus the Mire ring on that with control lever.

(4) Measurement; Press Measurement Button.

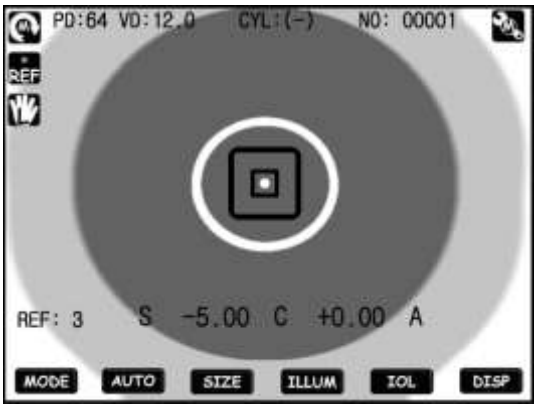
(5) Do as like (5) ~ (7) of 'R/K Mode'.

NOTES:

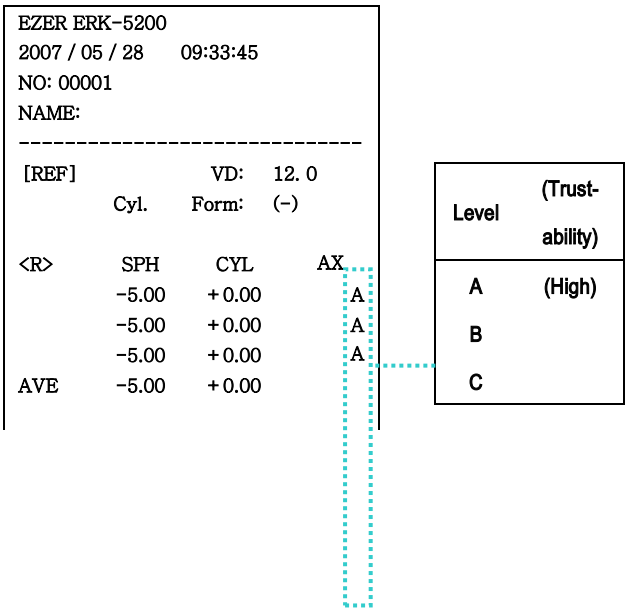
① If the pupil is out of the outside collimating mark, an error could happen.

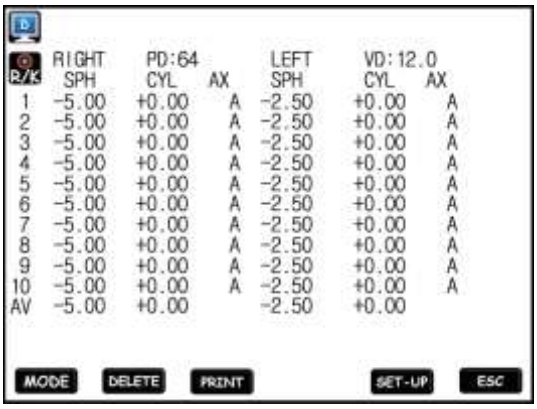
② An error could happen by the modification of cornea after surgery or the lens pollution.

③ During IOL switch is on, the trust-ability of measurement can be low.

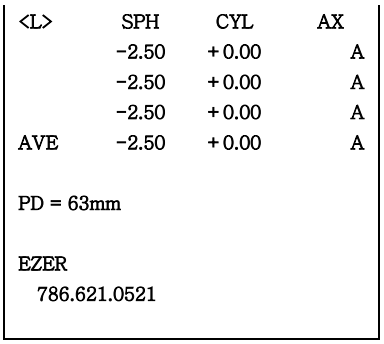


<After Measurement>

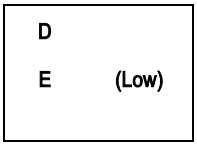




<DISPLAY>



<Print>



5-3 KER Mode

You can only measure a corneal curvature on this mode.

(1) Selecting KER Mode

Press the 'MODE' button few times until you can see the 'KER' mark on the top left of the monitor.

(2) Do as like (2) and (3) of 'R / K Mode'.

(3) Measuring

(a) Press the Measurement button.

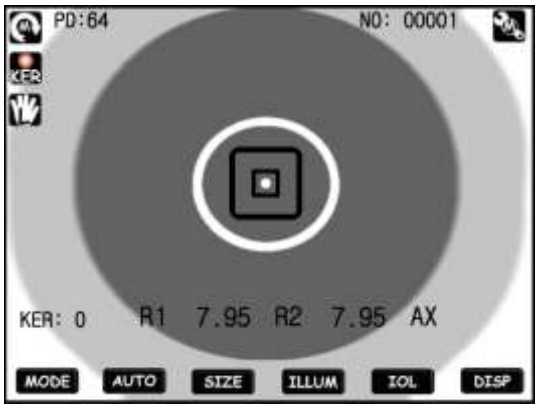
(b) After measuring, the result is displayed on the monitor.

(c) If you measure continuously, the last result would be displayed.

(4) Do as like (5), (6) and (7) of 'R / K Mode'.

NOTES:

On this mode, do not measure the base curve of the hard contact lens. Measurement error can occur.



<After measuring>

EZER ERK-5200
2007 / 05 / 28 09:33:45
NO: 00001
NAME:

[KER] Index: 1.3375

<R>	mm	D	AX
R1	7.95	42.50	
R2	7.95	42.50	
AVE	7.95	42.50	
CYL			

<L>	mm	D	AX
R1	7.95	42.50	
R2	7.95	42.50	
AVE	7.95	42.50	
CYL			

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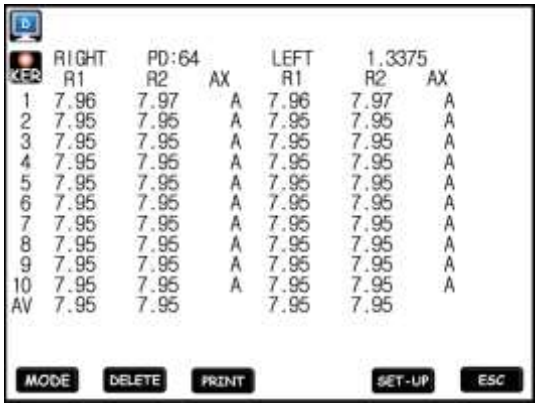
<Print>



<DISPLAY>

NOTES:

Safety information about infrared light radiation for measurement As light sources for measurement, this instrument adapted two type of infrared LED. It was chosen to satisfy the amount of energy exiting from the instrument never exceed the limit value recommended by the international standard ISO 15004. This condition is satisfied even when the instrument is operating at maximum light intensity and maximum aperture! (Maximum intensity is the highest brightness the instrument is capable of delivering, including the highest brightness achievable if overvoltage is provided) Detailed radiation information at normal usage of this instrument is like bellows.

① Keratometry measurement

Radiation output: below 0.03 mW/cm2 (Limit by ISO15504: 100mW/cm2)

② Refractometry measurement

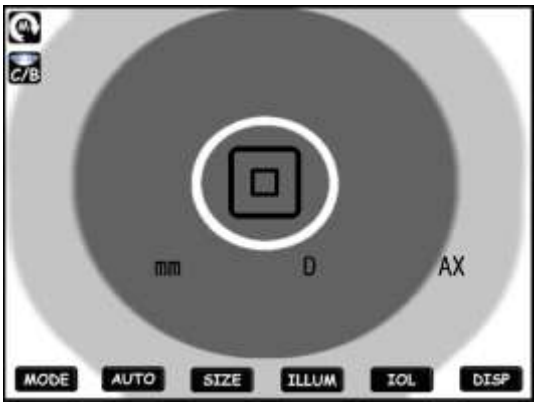
Radiation output: below 0.15 mW/cm2 (Limit by ISO15504: 100mW/cm2)

5-4 Measuring the Base Curve of a contact lens (C / B Mode)

You can only measure a base curve(concave side) of a hard contact lens on this mode.

(1) Selecting C / B Mode

Press the 'MODE' button until you can see the 'C / B' mark on the top left of the monitor.



<C / B Displayed Monitor>

(2) Bonding a contact lens

Put water on dent part of model eye for practice and put the measurement side of contact lens to the upside. The lens would be bonded by surface tension. Be careful lest the lens be glued obliquely and lest air bubble occurs inside the lens.

(3) Installing model eye

Remove chin-rest paper and fix the model on the chin-rest with clamping pin. Then the lens of model eye should be faced toward measurement window.

(4) Setting location and focus

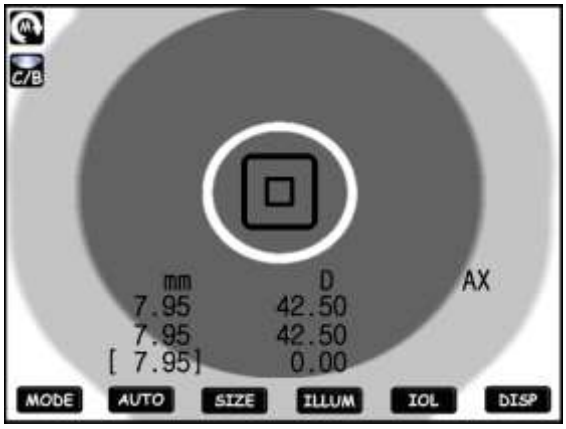
Arrange the Sigh Mark and the Mire ring. Set the focus of Mire ring.

(5) Measuring

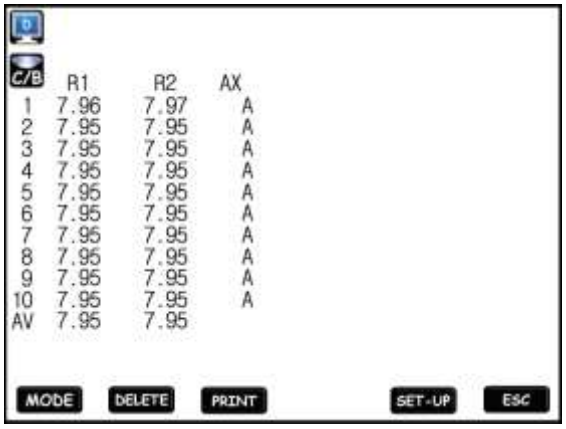
Press Measurement button. After measuring, the result is displayed on the monitor.

(6) Printing

Press PRINT button.



<After measuring>



<Scene Displayed>

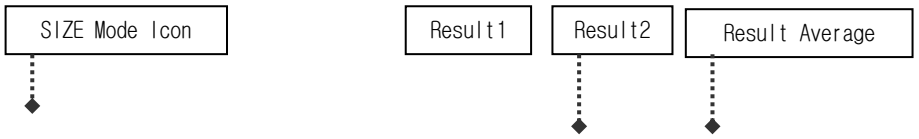
6. Other Functions

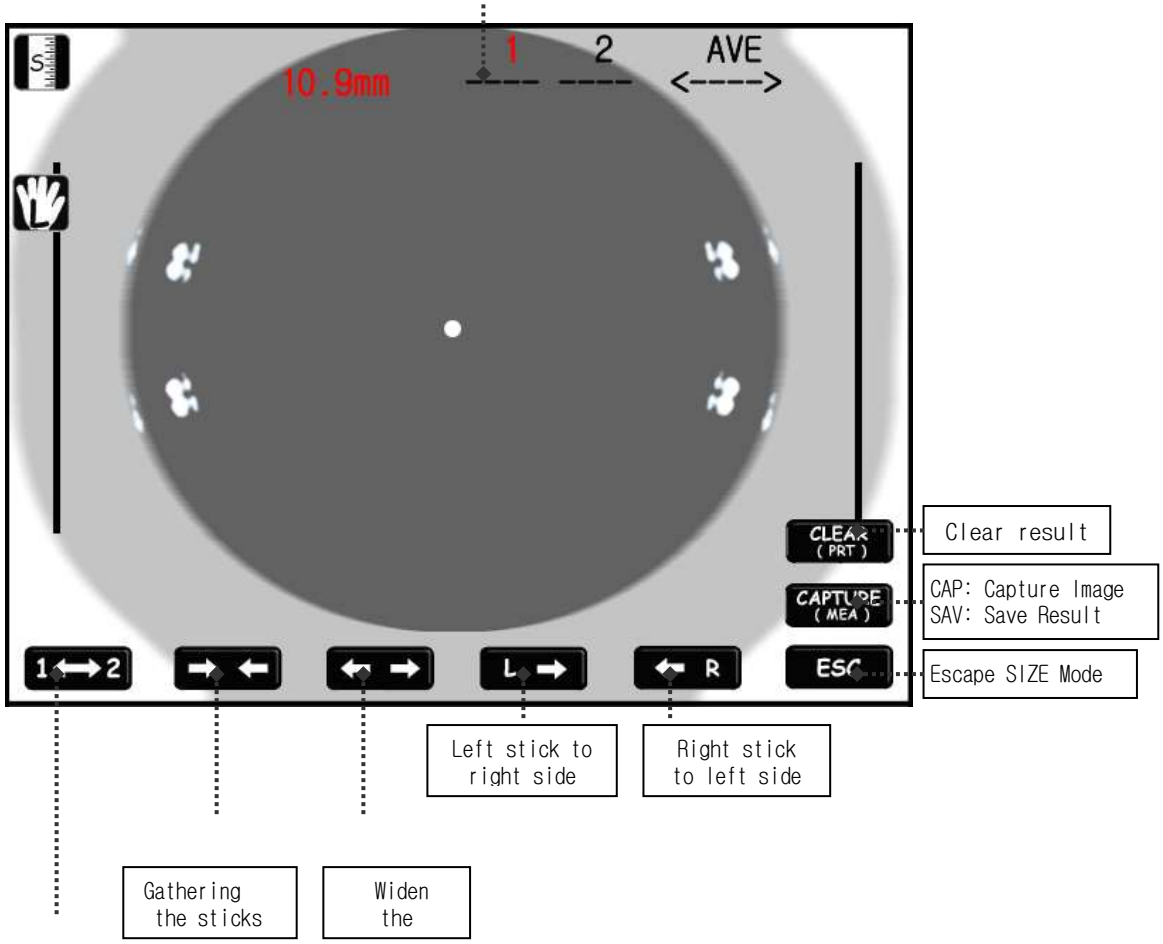
6-1 SIZE Mode

You can not only measure diameter of cornea to decide contact lens size in this mode but also measure how a pupil is distended. And you can measure size of the contact lens without removing it from his eye.

(1) Executing SIZE Mode

When you press SIZE button in Measurement Mode, SIZE Measurement Mode would be executed. To return to the Measurement Mode, press ESC button.





<Explanation for each function>

(2) Setting location and focus

(a) Require that see red roof of fixing target of inside to the patient.

(b) Move control lever and set so that pupil may be situated between two verticality sticks.

- If you want to measure diameter of contact lens, focus on outside part of lens.
- If you want to measure diameter of pupil, focus in iris

(3) Measuring

(a) If you press the measurement button, the screen will stop. Then if the screen is not clear, you can press CAMERA button to cancel it.

(b) You can move one of the vertical stick with 'L →' or '← R'

You can move both of the vertical sticks with '→←' or '←→'

(c) Measurement result is displayed on the monitor.

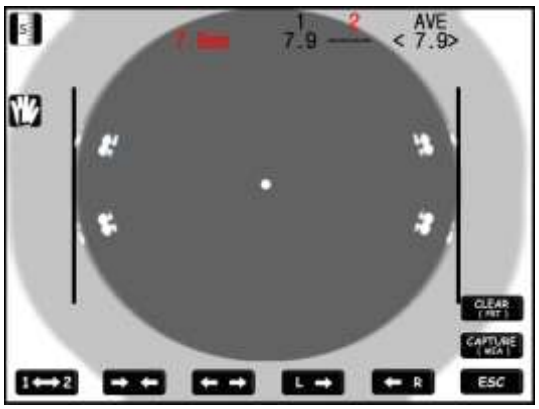
(d) If you press measurement button again, the result is stored. After cancel the still scene, result index will be changed. The result and the average are displayed each under '1' and 'AVE' on the top of the monitor,

(4) Selecting the result index; Whenever you press '1 ↔ 2' button, '1' or '2' is selected alternately.

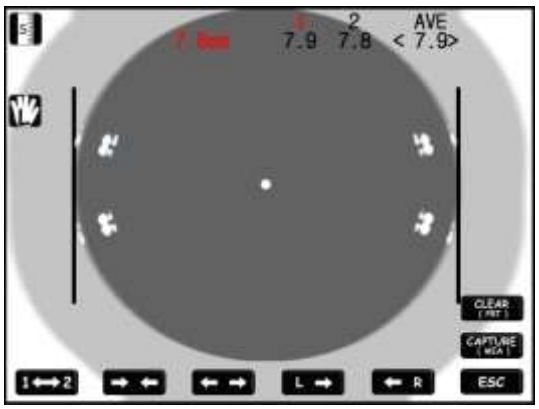
(5) Continuous measurement

Do (2) ~ (4) as many times as you need.

- Recent two results are displayed and stored.
- Average value of Recent two results is displayed under 'AVE'.



<1st measurement>



<2nd measurement>

(6) Measurement opponent eye

Push the Stage to opposite with control lever. Measure the opponent eye with equal method.

(7) Printing

Cornea diameter measurement result is printed by the internal printer as '[CORNEAL SIZE]' item.

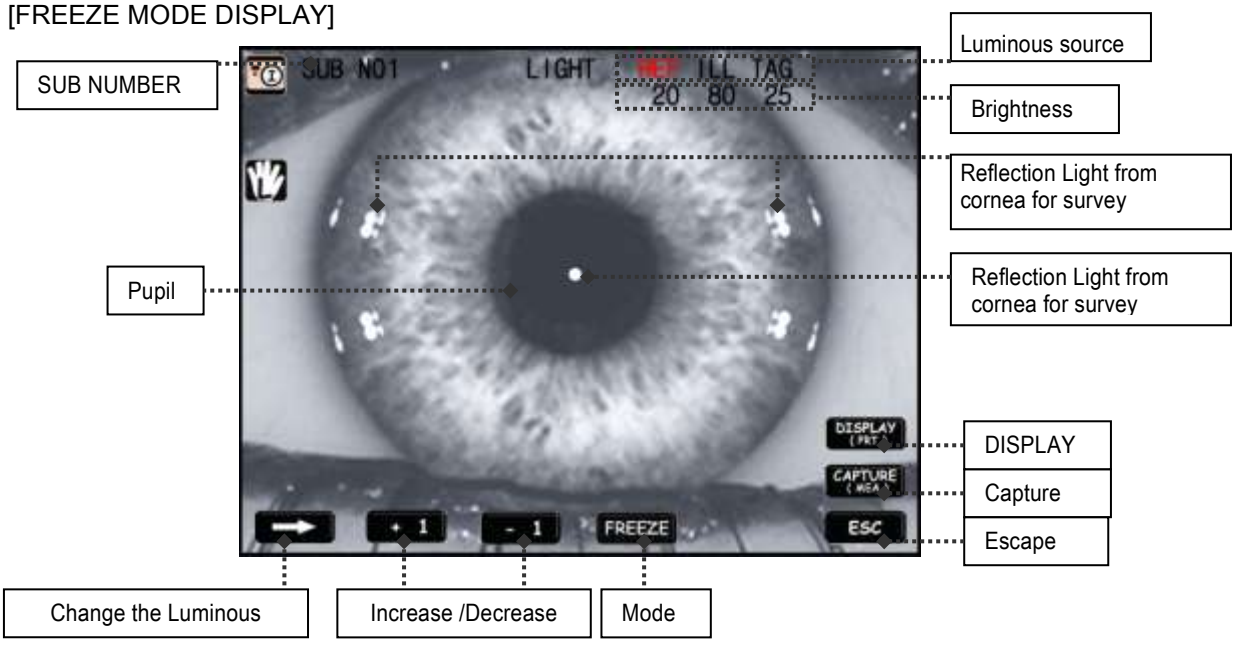
6-2 RET Mode

You can observe the stat of cataract or scar of contact lens on the monitor by flash on the pupil in this mode. You can store 2 images of each eye and can see and check them as a various size.

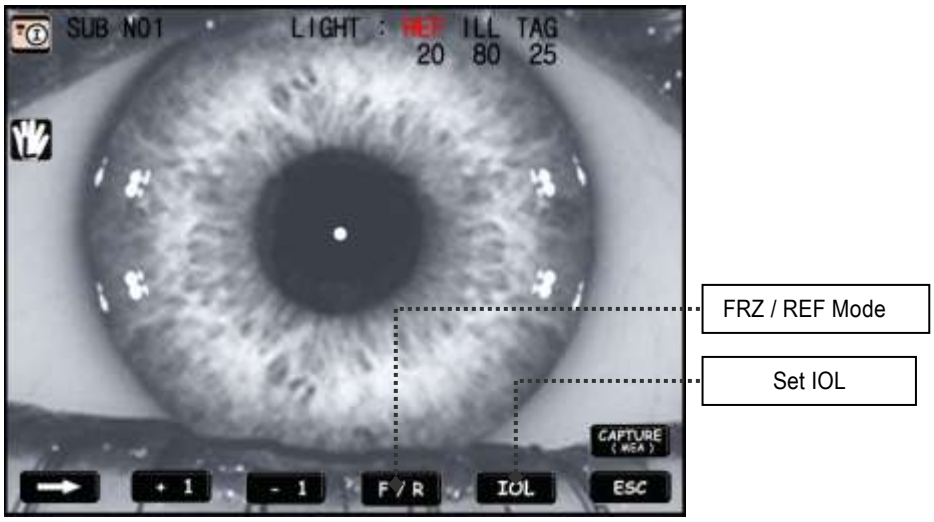
(1) Operating RET Mode

Press 'ILLUM' button to go to RET Mode. To return to measurement mode, press 'ESC' button.

[FREEZE MODE DISPLAY]



[FRZ / REF MODE DISPLAY]



(2) Ready for observing

Require that to see the fixing Target of inside to the patient.

Refer to (3) of R/K Mode for how to set the measurement location and focus.

(3) Observing

(a) Regulate each brightness of light so that the image to be seen clearly.

Press '→' button to change the source of light. The selected source of light is displayed as turning in the reverse direction.

※REF: Light for observation, ILM: Light for lightening the eye, TAG: Light for fixed target inside,

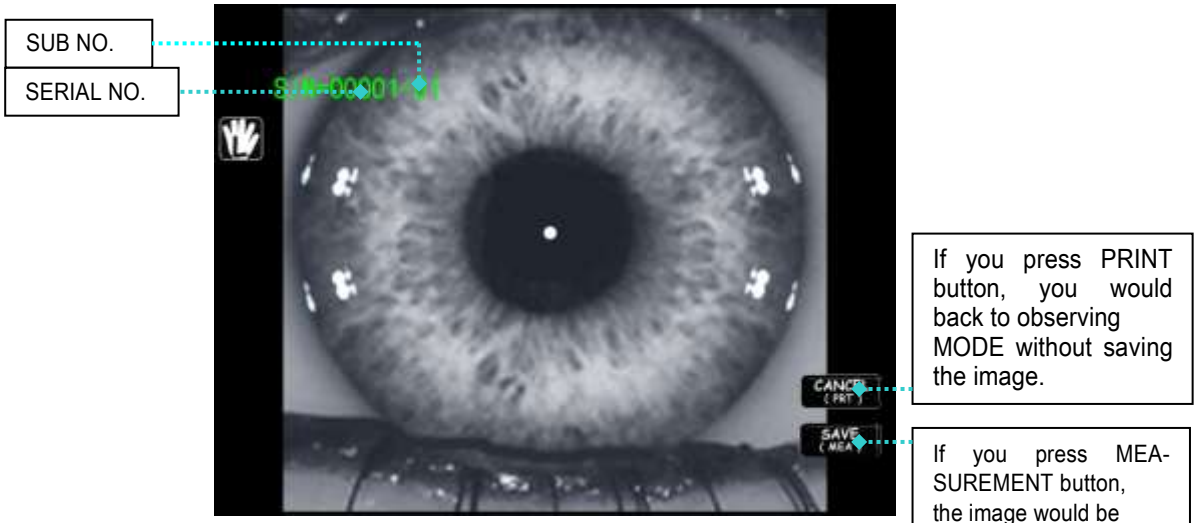
(A source of light can change from 0 to 100, and 0 means that emitting light device turns off)

(b) Control the lever to make the light to be clear which is reflected from cornea.

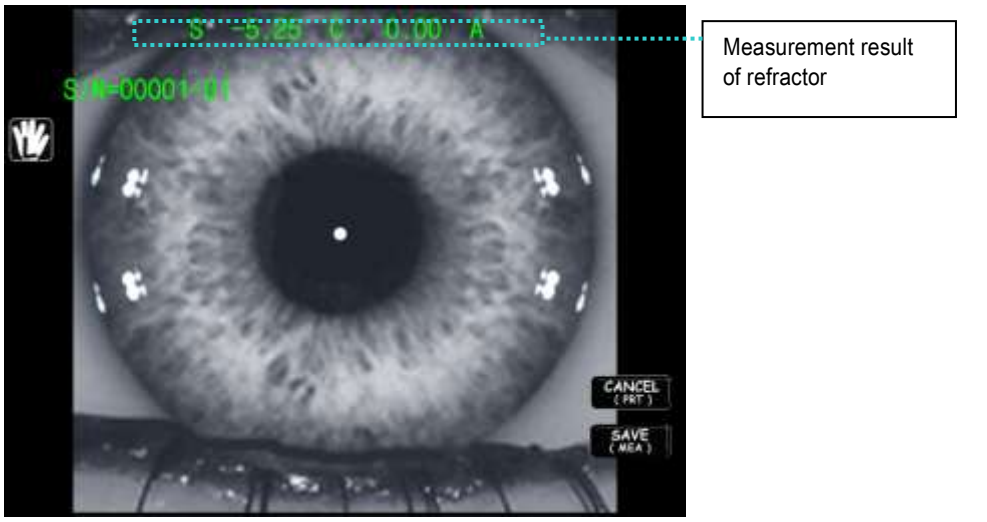
Then, observing the image could be easier when a light lights around the pupil.

(c) Focus the image on.

(d) When you focus the image on, if you press the measurement button, the image would be fixed.


SUB NO.
SERIAL NO.
S/N-00001 01
CANCEL (PRT)
SAVE (MEA)
If you press PRINT button, you would back to observing MODE without saving the image.
If you press MEA-SUREMENT button, the image would be saved.

<FREEZE Mode>

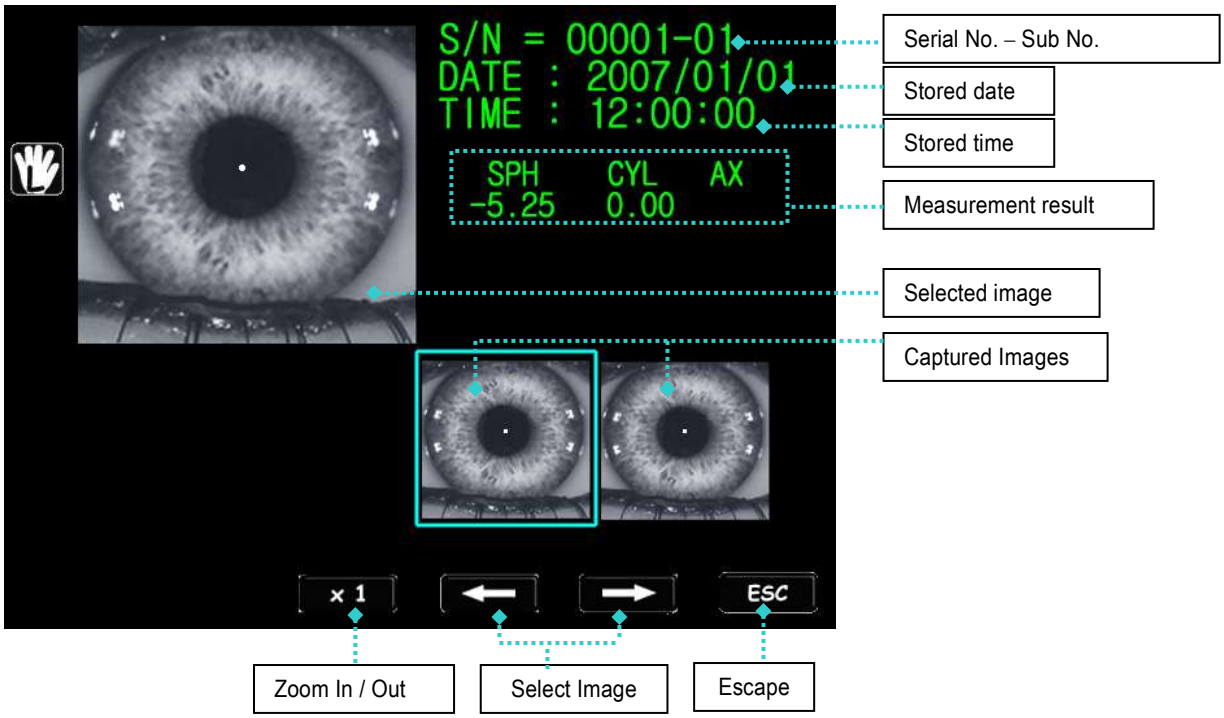


<FRZ / REF Mode >

(4) Menu Display

The stored images are displayed by pressing the PRINT button. It can store 2 images for each eye.

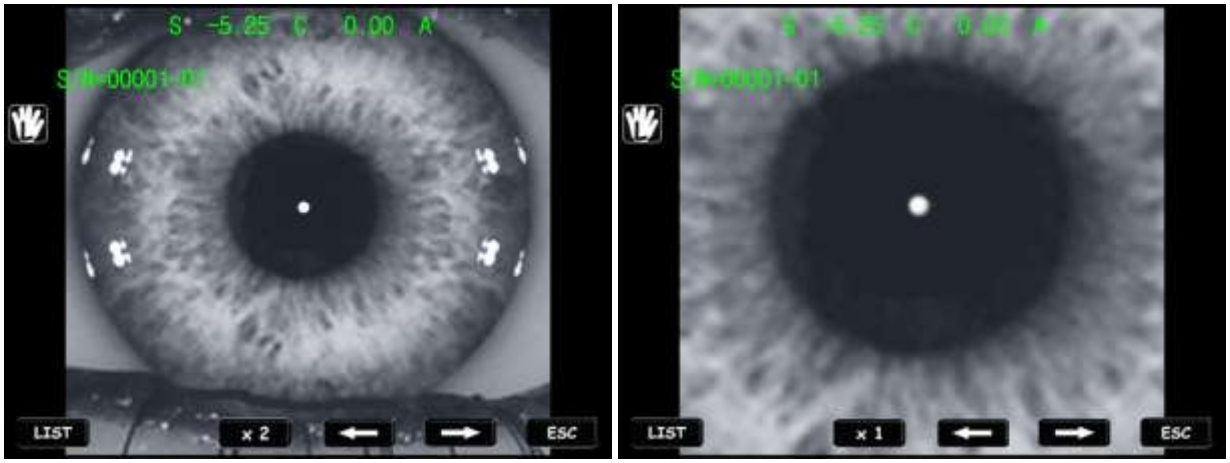
<MENU DISPLAY>



(5) To make the image enlarge

(a) Select an image with pressing '←' or '→' button.

(b) Press '×1' button.



<Normal> <Enlarged>

(c) Press 'LIST' button to back to MENU DISPLAY.

6-3 DISPLAY Mode

You can check the stored measurement results (max 10) on this mode.

You can go to this mode with pressing DISPLAY button on measurement mode.

NOTES:

① You can go to next page with pressing MODE button.

② You can delete all stored data in the memory with pressing DELETE button.

③ You can print with pressing PRINT button.

④ You can go to set up menu with pressing SET-UP button.

⑤ You can back to measuring with pressing ESC button.

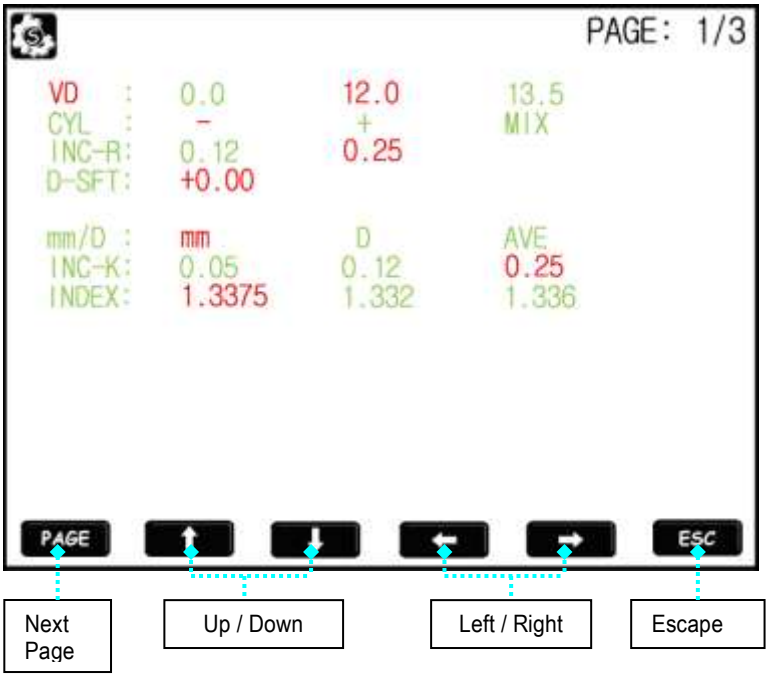
6-4 SETUP Mode

You can change everything about setting up. You can execute this mode with pressing 'DISPLAY' button first and 'SET-UP' button also on measurement mode. The 1st page of SETUP MODE would be displayed.

You can back to measurement mode with pressing ESC button.

(1) Set up the measurement of Refraction / Cornea (1 / 3)

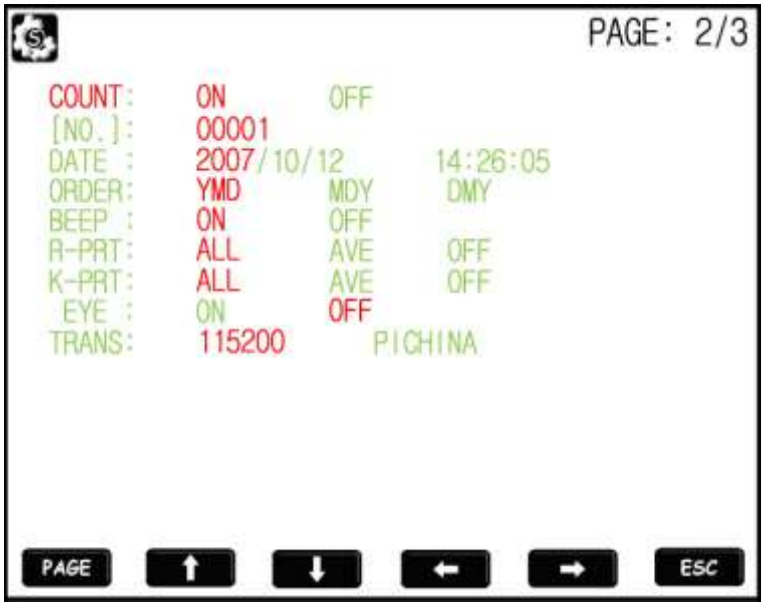
- Changing page: press PAGE button.
- Changing clause: You can select a clause with pressing '↑' or '↓' button.
- Changing contents: You can select a content with pressing '←' / '→' buttons.
- You can back to measurement mode with pressing ESC button.



[Measurement Item of Refraction / Cornea]			
VD	Vertex Distance		
CYL	Astigmatic indication form		
INC-R	Indication unit of a Spherical Surface and Astigmatism		
D-SFT	Corrected value of a spherical surface		
mm / D	Indication form of measuring cornea		
	• mm	- R1	The major axis radius
		- R2	The minor axis radius
		- AX	The major axis angle
	• D	- K1	The minimum refraction of cornea
		- K2	The maximum refraction of cornea
		- AX	The angle of the minimum refraction of cornea
	• AVG	- AR	Average curvature radius
		- CY	Cornea astigmatic degree
		- AX	Cornea astigmatic angle
INC-K	Indication form of cornea refraction and cornea astigmatic degree		
INDEX	The equivalence refraction of cornea		

(2) Serial No. Date and Time, Printing type.

- Changing page: press PAGE button.
- Changing clause: You can select a clause with pressing '↑' or '↓' button.
- Changing contents: You can select a content with pressing '←' / '→' buttons.
- You can back to measurement mode with pressing ESC button.

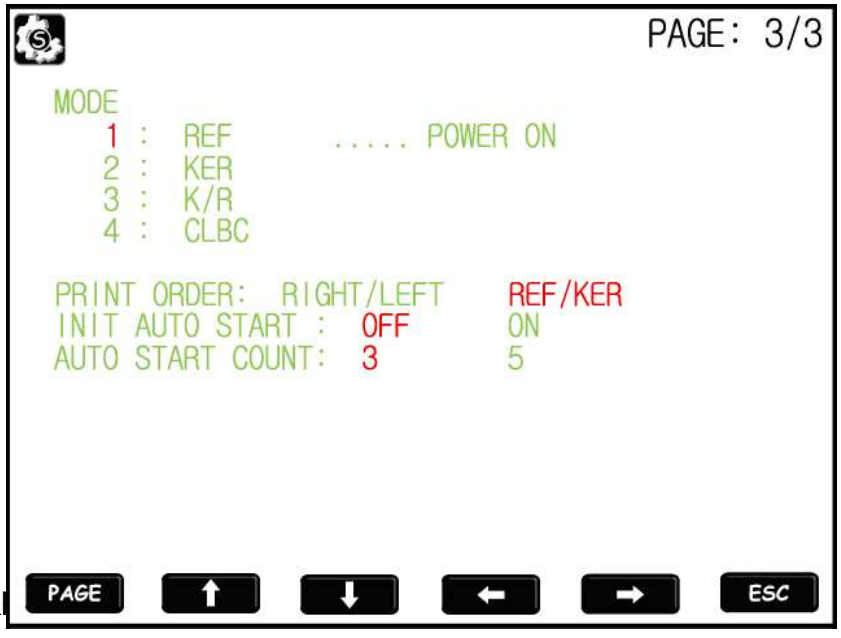


[Serial No., Date and Time, Printing type items]

COUNT	Select whether you use Serial No.
[NO.]	Set up serial numbers. • RESET ('PRT' button) would be displayed. • If the other clause is selected, 'RESET' would be disappeared. • When you press PRINT button, the serial number would be reset as '00001'. • When you press '←' and '→'button, the number will be changed by 1.
DATE	Set up the date and time. • 'INCREASE(measurement button)'/'DECREASE(PRT button)'would be displayed. • If the other clause is selected, 'RESET' would be disappeared. • When you press '←' or '→' button, the selected part will be changed. • When you press 'PRINT' or 'MEASUREMENT' button, the selected part will be changed by 1. - 2000 ~ 2099 : Year - 01 ~ 12 : Month

	- 01 ~ 31 : Day - 00 ~ 23 : Hour - 00 ~ 59 : Minutes - 00 ~ 59 : Second
ORDER	Set up the Indication form of the date.
BEEP	ON / OFF
R - PRT	Set up a print type of Refractometry Measurement Result. • ALL: Print the Last 10 results and averages • AVE: Print only average • OFF: No print
K - PRT	Set up a print type of Keratometry Measurement Result. • ALL: Print the Last 10 results and averages • AVE: Print only average • OFF: No print
TRANS	Set up the translation with other instruments. • 'INCREASE(measurement button)'/'DECREASE(PRT button)'would be displayed. • If the other clause is selected, 'RESET' would be disappeared. • When you press '⇐' or '⇒' button, the selected part will be changed. • When you press 'PRINT' or 'MEASUREMENT' button, the selected part will be changed by 1. • TRANS Speed: 1200, 2400, 4800, 9600, 19200, 57600, 115200 • TRANS Format: PICHINA, CANON-RK

(3) Set up the Measurement Mode



- Changing page: press PAGE button.
- Changing clause: You can select a clause with pressing '↑' or '↓' button.
- Changing contents: You can select a content with pressing '←' / '→' buttons.
- You can back to measure-ment mode with pressing ESC button

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[ITEMS]

MODE	REF, KER, R/K, CLBC. You can delete a mode unless it is useful. • 1: Basic mode. It can't be set to 'OFF'. • 2~4: Measurement mode after second. • Set the next after setting first measurement mode. • When you delete a mode, it should be started from the last one.
PRINT ORDER	Setting up a print order of a measurement result • RIGHT/LEFT; Pringting a measurement result of Right eye first and Left. • REF/KER; Printing a measurement result of both eyes of Refractometry first and both eyes of Keratometry.
INIT AUTO START	• OFF: After power on, you can measure manually. • ON : After power on, you can measure automatically.
AUTO START COUNT	• 3: You can measure 3 times automatically. • 5: You can measure 5 times automatically.

6-5 Power Saving Mode

If you do not operate anything for around 5 minutes, the power saving function will be operated.

You can return to measurement mode when you press any button.

7. Self diagnosis and Maintenance

7-1 Before you call to service engineer,

If there is any problem or mis-operation in this equipment, the warning is marked on screen. In this case, take action as follows. If it does not return to kilter though you took action as follows, turn the power off and call to a distributor or a service engineer which you can contact.

(1) Message when it turns on

Message	Cause	Action and Steps
• Motor Error • EEPROM Error • EEPROM Data Error • System Error • Clock Error	Problem inside the equipment	Turn the power off and on again in 10 seconds. When you see this message, please contact to a distributor.
• INVALID SETUP DATA - REF	Data problem inside Refractometr	Please call to a distributor.
• INVALID SETUP DATA - KER	Data problem inside Keratometry	Please call to a distributor.

(2) Message when you are measuring

Message	Cause	Action and Steps
ERROR	• Collimating is wrong.	Please measure after collimating cornea and collimation mark.
	• Eyelids or eyelashes are covering cornea.	Request that open his eyes widely to the object person, or lift his eyelids up and measure again.
	• Cornea is smaller than outside collimation mark.	You can measure the cornea which is more than 2mm. Though you can measure it in light place, but if you uncover it directly in sunlight, the pupil can be reduced.
	• The object person has disease such as cataract.	You observe eyes in RET mode. Unless a cataract is serious, you can measure in IOL mode.
	• Object person has been operated artificiality crystalline lens surgical operation.	Measure in IOL Mode.
	• When the Mire ring is not clear	Make the object to blink and blink his eyes.
	• When there's a trouble or disease in a	Can't measure.

	cornea.

Message	Cause	Action and Steps
+ OUT	• When the spherical Value is more than +22D • When the semi-diameter of curvature is more than 10.2mm	Can't measure.
	• When the lens of measurement window is polluted	Clean the lens.
- OUT	• When the spherical Value is less than -25D • When the semi-diameter of curvature is less than 5.0mm	Can't measure.
	• When the lens of measurement window is polluted	Clean the lens.
C OUT	• When the astigmatism value is more than 10D • When the cornea astigmatism value is more than 15D	Can't measure.
	• When the lens of measurement window is polluted.	Clean the lens.

(3) Messages in Printing

Message	Cause	Action and Steps
No Print Data	No data.	Measure and print.
PRINTER PAPER EMPTY	No Paper.	Supply papers.

7-2 Solving Problem

7.2.1 When you press PRINT button but it doesn't print,

(1) Check whether the printing function is OFF in user set up mode.

(2) Check whether the printing paper is 'Thermal Paper' and the direction of paper as well.

7.2.2 When the print is not clear

(1) Close printer cover up again so that sounds 'clack' around print roller

(2) Or separate roller from print cover and clean the contact part.

7-3 Replacement of paper

7.3.1 Print paper

When there is a red line on the paper, replace it. Then you should check the standard of paper. (※ Thermal Paper, Size; width 58mm / diameter 50mm)

(1) Open the print cover and put the old one out from the case.

(2) Put the new one in to the case, Extract the end part of paper through aperture of print cover. You should distinguish type-face of paper exactly.

(3) Close Printer Cover up so that sounds 'clack'.

7.3.2 Chin rest paper

(1) Unplug two setting pin from chin rest.

(2) Insert setting pin on hole of the paper.

(You can insert more than 50 pieces of paper on the hole.)

(3) Insert the pins on two holes in chin rest.

7-4 Cleaning Equipment

(1) Keep this equipment clearly. Do not use any volatile liquid to clean

(2) Please use soft piece of cloth which is wetted a little by soapy water.

7-5 If you want to move this equipment,

(1) Turn off the main switch.

(2) Separate the electric wire from socket.

(3) Turn the stage clamp screw to the right to lock it.

(4) You must hold and lift the lower part and move that keeping horizontality.

7-6 Service Information

(1) Maintenance

If you can not solve a problem after doing as above 7.1(self diagnosis),

please try to contact to distributor.

(2) Supply of spare parts and accessories for maintenance

Spare parts and accessories of this equipment will be supplied for 8 years even after discontinuance of manufacturing

.

(3) Equipment Treatment

CAUTION

This equipment has lithium battery that can contaminate environment when got into leaving alone. You must ask how to handle this to distributor or an waste disposal company before you dispose of this.

MEMO